Public Works
Standard Drawings
Subcommittee Meeting

Monday, April 13, 2020
WebEx
Welcome and Introductions
Meeting Summary
Division 2000: Pavement Systems
# DIVISION 2000 PAVEMENT SYSTEMS

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8” minimum stabilized subgrade per section 301 and as approved or specified by owner

3. Alternative subgrade, thickness, and steel may be utilized with more detailed study and analysis and as approved by owner

4. If lime stabilized subgrade is utilized a minimum of 40 lbs/sey is required

Replace Plan with a more general layout to include crosswalks, ADA ramps, striping, and possibly additional lane width for bicycle lanes per TxDOT
3. Alternative subgrade, thickness, and steel may be utilized with more detailed study and analysis and as approved by owner.

4. If lime stabilized subgrade is utilized a minimum of 40 lbs/sy is required.

5. See detail 2170 for sidewalks.

Replace Plan with a more general layout to include crosswalks, ADA ramps, striping, and possibly additional lane width for bicycle lanes per TxDOT.
sidewalk width varies (5 ft min)

NOTE: Sidewalk width varies (min 10 ft)

buffer setback varies 4-6 ft (min)

Varies

11 ft

12 ft

Buffer varies

Ref Ch. 2 (Forms of Separation)
FHWA Sep. Bike Lane

Bike Lane
5-7 ft

Ref Ch. 4 (Design of on-Road Facilities)

Intersection

Switch lane with turn lane
LEFT TURN SECTION

N.T.S.

Δ=11°28'40"
R=250.00'
T=25.13'
L=50.08'

V = 15’ MIN.

R.O.W. 20’ R.

V = 24’ V.

R.O.W. 24’ V.

V = 24’ V.

CHANNELIZING BUTTONS ON 5 CENTERS

R.O.W. 20’ R.

20’ R.

Bike Box

Bike Lanes

Intersecting
Crossing
Markings

Varies
Ref. NACTO Urban Bikeway
Design Guide (Intersections) chapter

1. Sawed Longitudinal
Contraction Joint
or Construction Joint.

Bike Box varies
Ref. NACTO Urban Bikeway
Design Guide (Intersections chapter)

NOTES:
1. Min. Pavement depth and strength shall
be 8” – Class “C” or “PC”, or as specified by owner.

2. Min. Curb height and width shall be 6”,
or as specified by owner.

3. Alternate Reinforcement shall be #4
bars on 30” centers both ways.
2. Alternative subgrade, thickness, and steel may be utilized with more detailed study and analysis and as approved by owner.

8” minimum stabilized subgrade per section 301 and as approved or specified by owner.

4. Straight crown or parabolic crown as approved by owner.

5. See detail 2170 for sidewalks.
1. Crown section may be used in lieu of invert with provision of an adequate drainage design and as approved by owner

3. Alternative subgrade, thickness, and steel may be utilized with more detailed study and analysis and as approved by owner

6. See detail 2170 for sidewalks

8” minimum stabilized subgrade per section 301 and as approved or specified by owner
No. 4 Bars on 18” CTRS. Both ways

1. Apply backer rod as approved by owner
NOTES:
1. SAWED TRANSVERSE CONTRACTION JOINTS SHALL BE SPACED:
   2' IN PAVEMENT ≥ 8" THICK;
   12" IN PAVEMENT ≤ 8" THICK.
2. REFER TO TYPICAL PAVEMENT SECTION FOR LONGITUDINAL JOINT SPACING.

SPACING DIAGRAM FOR TRANSVERSE JOINTS
N.T.S.

*cleanup lines through median*
Remove detail and reference TxDOT detail in specs if needed
4.1

5. See detail 2170 for sidewalks

8” minimum stabilized subgrade per section 301 and as approved or specified by owner
8” minimum stabilized subgrade per section 301 and as approved or specified by owner

5. See detail 2170 for sidewalks
4. Straight crown or parabolic crown as approved by owner

5. See detail 2170 for sidewalks

8” minimum stabilized subgrade per section 301 and as approved or specified by owner
INTEGRAL CURB & GUTTER

SEPARATE CURB & GUTTER

NOTES:
1. REINFORCEMENT SHALL BE NO. 4 BARS, UNLESS OTHERWISE SPECIFIED.
2. CONCRETE SHALL BE CLASS "C" OR "PC".
3. "CF" IS 6" UNLESS OTHERWISE SPECIFIED.
4. ALL CURBS ARE CONSTRUCTED OF PORTLAND CEMENT CONCRETE UNLESS OTHERWISE ShOWN.
5. GRADE SHALL BE MEASURED AT BACK OF CURB.

DOWELED CURB

CONCRETE CURB & GUTTER INTEGRAL, SEPARATE, & DOWELED
FIGURE 1
PARKWAY CURB RAMPS
If "a" is less than 6" then the slope of the flared side shall not exceed 1:12.

FIGURE 2
BUILT-UP CURB RAMP

reference TxDot
Update and remove 2125A or update to reference other detail
CONCRETE NOSE FOR MEDIAN ISLAND

NOTE:
MEDIAN PAVING SHALL EXTEND TO POINT WHERE MEDIAN IS 6' WIDE. IF MEDIAN IS 6' WIDE, PAVING SHALL EXTEND 10' FROM NOSE. FOR MEDIANS WIDER THAN 6', PAVING SHALL EXTEND 10' FROM NOSE. ALL DistANCES ARE MINIMUM.

DIMENSIONS OF MEDIAN NOSE

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<td>27.6'</td>
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<tr>
<td>16'</td>
<td>28.8'</td>
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<tr>
<td>17'</td>
<td>29.9'</td>
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<tr>
<td>18'</td>
<td>30.9'</td>
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Move arrows to outside lines or change to "B. to B."
Move arrows to inside lines

as specified by owner
Low profile MONOLITHIC CONCRETE MEDIAN NOSE

As specified by owner

NOTE:
REINFORCEMENT BARS SHALL MATCH THOSE IN PAVEMENT.
Update 2150, 2155, 2160 and to include residential, commercial and alley approach

Eliminate keyway joint

Show doweling as option

Residential
Update 2150, 2155, 2160 and to include residential, commercial and alley approach.
Add cross section view like 2150A

Update 2150, 2155, 2160 and to include residential, commercial and alley approach

Residential

3600 PSI
Update 2150, 2155, 2160 and to include residential, commercial and alley approach

Over 12% grade break is not recommended?

#4 Bars on 18” CTRS?

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<th>R.O.W. WIDTH (C)</th>
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<td>2' - 6''</td>
<td>12'</td>
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<td>2' - 6''</td>
<td>22'</td>
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Arlington’s Driveway Approaches
NOTES:
1. THE SLOPE OF THE DRIVE WHERE SIDEWALKS CROSS SHALL HAVE A MAXIMUM CROSS SLOPE OF 2%.
2. REMOVE ANY EXISTING SIDEWALK AT NEAREST JOINT AND CONNECT REPLACED SECTION „TO DRIVE ARM“ (3) — NO. 4 SMOOTH DORMER RABBED ON 18" CENTERS WITH 3/4" REDWOOD EXPANSION JOINT MATERIAL, WITH 1" REMOVABLE CAP STRIP SEAL WITH SELF-LEVELING GRAY SILICONE SEALANT.
3. RESIDUAL 60% GRAY THICKNESS 5/8"
   ALL OTHERS 3/8 5/8"
   VARIOUS SLOPE DESIGNED FOR NEW DEVELOPMENT CONSTRUCTION ONLY AND DOES NOT APPLY TO CAPITAL IMPROVEMENT RECONSTRUCTION OR REBUILD PROJECTS.
   (ALSO SEE THE DESIGN CRITERIA MANUAL FOR OTHER SPECIFIC CRITERIA.)
4. ALL CONNECTIONS TO STATE RIGHT-OF-WAY SHALL USE DETOUR DETAILS.
5. FOR CITY CAPITAL IMPROVEMENT PROJECTS, MEASUREMENT FOR DRIVEWAY QUANTITY BEING 6" FROM BACK OF CURB. MEASUREMENT OF CURB & GUTTER QUANTITY IS THROUGH THE DRIVE APPROACH.
6. ALL CURB AND GUTTER SHALL BE 30" UNLESS OTHERWISE DIRECTED BY THE CITY.
7. CONCRETE SHALL BE CLASS 0, 5 1/2 SACK AND HAVE COMpressive STRENGTH OF 3000 PSI @ 28 DAYS.
8. P STREET IS BEING REPLACED, PAVEMENT THICKNESS SHALL BE 6" FOR RESIDENTIAL AND 8" FOR COLLECTOR OR LARGER.

TYPICAL DRIVE APPROACH CONNECTING TO ASPHALT STREETS WITH CURB AND GUTTER

NTS REV: 8/15/17

SECTION 'A-A'

NTS
1. The slope of the drive where sidewalks cross shall have a maximum cross slope of 2%.

2. Slope (max) Slab Thickness
   - Residential 6% 6"
   - All Others 3% 6"

* Maximum slope is designated for new development construction only and does not apply to capital improvement reconstruction of existing projects.

   (Also see the design criteria manual for other specific criteria.)

3. All connections to stone right-of-way shall use 100 foot details.

4. Concrete shall be Class C, 5 1/2 sack and have compressive strength of 3600 psi @ 28 days.

5. Minimum velocity through pipe is 2.5 fps. Minimum slope in pipe is 0.05% unless otherwise designed to meet minimum slope requirements.

6. In some cases a sump may be provided in lieu of the pipe. The property owner and owner’s engineer will need to determine if a sump can be used in lieu of a pipe.

Minimum 18" diameter pipe with headwalls or sloped end sections. Actual size will need to be determined by property owner and owner’s engineer.
NOTES:

1. THE SLOPE OF THE DRIVE WHERE SIDEWALKS CROSS SHALL HAVE A MAXIMUM CROSS SLOPE OF 2%.

2. REMOVE ANY EXISTING SIDEWALK AT NEAREST JOINT AND CONNECT REPLACED SECTION TO DRIVE WITH (3) - NO. 4 SMOOTH DOWEL BARS ON 18" CENTERS WITH 3/4" REDWOOD EXPANSION JOINT WITH 1" REMOVABLE CAP STRIP SEAL WITH SELF LEVELING GRAY SILICONE SEALANT.

3. RESIDENTIAL 6" 8"
   ALL OTHERS 3" 8"

4. MAXIMUM SLOPE DESIGNATED FOR NEW DEVELOPMENT CONSTRUCTION ONLY AND DOES NOT APPLY TO CAPITAL IMPROVEMENT RECONSTRUCTION OR REBUILD PROJECTS.

5. FOR PAYMENT MEASUREMENT FOR DRIVEWAY QUANTITY BEGINS 6" FROM BACK OF CURB.

6. CONCRETE SHALL BE CLASS C, 5 1/2 SACK AND HAVE COMPRRESSIVE STRENGTH OF 3000 PSI @ 28 DAYS.

7. IF CONSTRUCTING A DRIVEWAY ON AN EXISTING CONCRETE STREET, SAW-CUT (FULL DEPTH) AND CONNECT WITH EPOXY TIE BAR JUNCT JOINT.

8. ALL REDWOOD EXPANSION JOINTS SHALL BE SEALED WITH SELF LEVELING GRAY SILICONE SEALANT.

SECTION 'A-A'

TYPICAL DRIVE APPROACH ON A CONCRETE STREET

NTS REV: 1/17/20
Carrollton’s Driveway Approaches
NOTE:
1. FOR CONSTRUCTION JOINT DETAILS, SEE P-11. FOR EXPANSION JOINT DETAILS, SEE P-12.
2. STORAGE LENGTHS SHALL BE AS SHOWN OR IN ACCORDANCE WITH THE LATEST VERSION OF CHAPTER 25 OF THE CARROLLTON CODE OF ORDINANCES.
3. SIDEWALK SHALL BE AT A 2% CROSS SLOPE ACROSS THE Driveway.

GENERAL DESIGN STANDARDS
PAVING DETAILS

COMMERCIAL DRIVE APPROACH

CARROLLTON
TENNSY

ENGINEERING DEPARTMENT

SCALE: 1/75
DATE: 05/2037
SHEET 1 OF 2
COMMERCIAL APPROACH (CONCRETE PAVING)

COMMERCIAL APPROACH (ASPHALT PAVING)

NOTE:

SEE P. 10 FOR BARRIER FREE RAMP DETAIL.
RESIDENTIAL DRIVE APPROACH TO STREET

GENERAL DESIGN STANDARDS
PAVING DETAILS

RESIDENTIAL DRIVE APPROACH
PLAN VIEW

P-16
ENGINEERING DEPARTMENT
CONCRETE CURB SET 1/2" (13 MM) BELOW TOP OF PAVINGS AND CONTROL JOINTS @ 4'-0" (1.2 M) O.C.

CONCRETE PAVER
2 3/4" (70 MM) MIN. THICKNESS

3" (75 MM) BEDDING SAND AS DEFINED BY ASTM C33

AGGREGATE BASE COMPACTED TO WIDTH OF MODIFIED PROCEDURE PER ASTM C1397
6" (150 MM) MIN. DEPTH

4" (100 MM) THICK GEOTEXTILE ALONG PERIMETER
TURN UP AT CURB (DO NOT COVER TOP OF BASE)

GEOTEXTILE AS REQUIRED
TURN UP AT SIDES TO COVER BASE

COMPACTED SUBGRADE

RESIDENTIAL DRIVEWAY WITH CONCRETE PAVERS

NOTES:
1. THICKNESS OF AGGREGATE BASE WILL VARY WITH SUBGRADE CONDITIONS.
2. CONCRETE PAVERS SHOULD BE PLACED ON A CEMENT-TREATED BASE IF SOIL IS EXTREMELY WEAK OR CONSTANTLY SATURATED.
3. BASE MATERIAL SHALL CONFORM TO ASTM C257.
4. PRECAST CONCRETE CURBING MAY BE USED.

GENERAL DESIGN STANDARDS
PAVING DETAILS
RESIDENTIAL DRIVEWAY WITH CONCRETE PAVERS
Coppell’s Driveway Approaches
SECTION A-A

1.20 (5%) MAX

SECTION B-B

1.20 (5%) MAX

NOTES:
1. ALL CURB AND GUTTER SHALL BE 6" - CLASS "C", OR AS SPECIFIED BY CITY.
2. Curb height and width shall be 6", or as specified by city. See standard construction detail 210.
3. SUBGRADE OR SUBGRADE MATERIALS (If Required)
   All subgrade shall be properly compacted to a density not less than 95% standard proctor density.
   Subgrade and subgrade material shall be free of loose, soft or watery soils.
   All materials shall be submitted to the city for approval.

MATERIAL TYPES

STANDARD CONSTRUCTION DETAILS

DRIVEWAY APPROACH

TYPE A

COPPELL

STANDARD SPEC

REFERENCING

301, 303, 305

STANDARD DETAIL

2150-2

CITY OF COPPELL, DALLAS COUNTY, TEXAS
COMMERCIAL Driveway with Decorative Paving

SECTION A-A

NOTES:
1. Min. pavement depth and grade shall be:
   - 6" = Class "C", or as required by City
2. Cross slope and min.铺 width shall be 47", or as required by City
   - See standard construction details 0.135
3. Sidewalks (min. 48") and grades shall be:
   - Attaches by City Choice
   - See standard construction details 0.135
   - Sidewalks shall be installed in the street
     - See standard construction details 0.135
   - Sidewalks shall be supported by an engineered concrete base
   - All sidewalk shall be installed on a 1:20 (5%) grade

SECTION B-B

NOTES:
1. Minimum thickness shall be:
   - 4" = Class "C", or as required by City
2. Cross slope shall not exceed 1:20 (5%)
NOTES:
1. PAVEMENT DEPTH AND STRENGTH SHALL BE 8" - COMMERCIAL OR AS SPECIFIED BY CITY.
2. CURB HEIGHT AND WIDTH SHALL BE 8", OR AS SPECIFIED BY CITY.
3. SUBGRADE (EXCEPT ROADWAYматериал) SHALL ADHERE TO THE Specifications OF COMMERICAL MATERIAL.
4. ALL PAVEMENT SHALL BE HOMOGENEOUS IN COLOR AND LOCATION OF MATERIAL USED, AND COMPACTED TO A DENSITY NOT LESS THAN 95% OF THE THEORETICAL MAXIMUM DENSITY.
5. ALL MATERIALS TO BE CORRECTED BY LABORATORY TESTING.
6. EVAPORATION AND SETTLEMENT DATA TO BE COMPLIED WITH IN THE FIELD.
7. STANDARD CONSTRUCTION DETAILS.

EXPANSION JOINT AT SEWER TRANSITION, TOP:
R.O.W.

6" THICK SIDEWALK

7.00

1.50 MAX (2")

4" THICK SIDEWALK

NON-PAVING SURFACE

TOOLED JOINT

CONSTRUCTION JOINT IF NOT CONSULTING WITH STREET PAVING

4" THICK SIDEWALK

NON-PAVING SURFACE

TOOLED JOINT

CONSTRUCTION JOINT IF NOT CONSULTING WITH STREET PAVING

20.00

6" SIDEWALK PAVING
Flower Mound’s Driveway Approaches
PROVIDE EXPANSION JOINT ONLY IF CONNECTING TO EXISTING CONCRETE DRIVE

R.O.W. LINE

6" DRIVEWAY WITH #3 @ 18" EACH WAY STANDARD SIDEWALK

20'-0" MINIMUM SINGLE DRIVEWAY
27'-0" MINIMUM DOUBLE DRIVEWAY

NOTE:
EXISTING CURB AND GUTTER, IF ANY, MUST BE SAWED AS DIRECTED BY THE TOWN ENGINEER.

5" PENETRATION EPOXY
#4 DEFORMED BARS

4'-0" SIDEWALK
1/4" PER FT. TO FACE OF CURB

6" DRIVEWAY WITH #3 @ 18" EACH WAY

ROADWAY SUBGRADE

STANDARD CURB AND GUTTER

SECTION A-A

NOTE:
SIDEWALK SECTION THRU DRIVEWAY SHALL BE Poured SAME THICKNESS AS DRIVEWAY APPROACH (EXISTING SIDEWALK, IF ANY, SHALL BE REMOVED AND REPLACED).

DATE: OCT 2009
SHEET 3 OF 9
SHEET: ST-8

STANDARD PAVING DETAILS
DRIVEWAY APPROACH/HORIZONTAL CURB CUT ON EXISTING ROADWAY
NOTE:
EXISTING CURB AND GUTTER, IF ANY, MUST BE SAWS AS DIRECTED BY THE TOWN ENGINEER. HORIZONTAL CURB CUT SHALL BE MADE AT AN ELEVATION OF 0.5 FT ABOVE THE EXISTING GUTTER WITH A MINIMUM LENGTH AS SHOWN. THE TRANSITIONAL SAW CUT SHALL HAVE A RUN OF 2'-6" AND SHALL RISE TO MEET THE EXISTING TOP OF CURB. ALL EXPOSED ENDS SHALL BE GROUNDED TO A 2'-6" CURB. 1/4" RADIUS. SAW CUTTING SHALL BE PERFORMED WITH A RIDE-ON SAW EQUIPPED WITH A DIAMOND SAW BLADE.

NOTE:
SIDewalk section thru driveway shall be poured same thickness as driveway approach (existing sidewalk, if any, shall be removed and replaced).

SECTION A-A

DATE: OCT 2009

STANDARD PAVING DETAILS

DRIVEWAY APPROACH / HORIZONTAL CURB CUT
FOR DRIVES ON EXISTING ROADWAY
NOTES:
1. PROVIDE EXPANSION JOINT IF DRIVEWAY APPROACH CONNECTS WITH EXISTING CONCRETE DRIVEWAY.
2. DRIVEWAY APPROACH SHALL BE 6" REINFORCED CONCRETE PAVEMENT WITH #3 @ 18" EACH WAY.
3. MINIMUM WIDTH FOR SINGLE DRIVEWAYS IS 12'-0" AT R.O.W. MINIMUM WIDTH FOR DOUBLE DRIVEWAYS IS 18'-0" AT R.O.W.
4. INSTALL PRECAST SAFETY END TREATMENTS FOR RCP PER TXDOT STANDARDS OR AS APPROVED BY TOWN ENGINEER.
5. MINIMUM CULVERT SIZE IS 18".
**Class C**

**2% max.**

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**REINFORCED CONCRETE SIDEWALKS**

**JOINTS AND SPACING**

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**NOTE:**

1. REFER TO STANDARD SPECIFICATION ITEM 305.2 FOR ALTERNATE REINFORCEMENT.
2. CROSS SLOPE OF SIDEWALK SHALL BE ACCORDING TO ITEM 302.1.2 FOR THE MAXIMUM P.E.
3. OTHER THAN 6'-0" SIDEWALK WIDTH MAY BE SPECIFIED BY OWNER.
4. SIDEWALK SHALL BE CLASS "A" CONCRETE UNLESS OTHERWISE SPECIFIED BY OWNER.
5. ALL HONEYCOMB IN BACK OF CURB TO BE TROWEL-PLASTERED BEFORE POURING SIDEWALK.
6. LUG MAY BE FORMED BY SHAPING SUBGRADE TO APPROXIMATE DIMENSIONS SHOWN.

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**J O I N T S  A N D S P A C I N G**

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**SIDEWALK**

---

**2% max.**

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**Class C**
REINFORCED CONCRETE RETAINING WALL INTEGRAL WITH SIDEWALK

RETAILING WALL WITH INTEGRAL SIDEWALK

NOTE:
1. PROVIDE VERTICAL EXPANSION IN WALL AT 25' MAX. SPACING (USE EXPANSION JOINT, STANDARD DRAWING NO. 2010, AND MODIFY AS REQUIRED)
2. WALL DESIGN ASSUMES NO SURCHARGE, A SPECIAL ENGINEERING ANALYSIS IS REQUIRED FOR OTHER CONDITIONS.

BACKFILL WITH SAND AFTER FORM REMOVAL *

8" BARS AT 12" CNTRS. BOTH WAYS (USE #4 BENT BARS WHERE H EXCEEDS 3')

4" SAND CUSHION *

2% max.

COMPACTED SUBGRADE = 96% MAXIMUM DENSITY PER ASTM D 698.

95%

"A" CONCRETE

CLASS "A" CONCRETE

3/4" CHAMFER

9" x 12" CONTINUOUS POCKET OF CLEAN COARSE 3/8" TO 1 1/2" GRAVEL WITH FILTER FABRIC

3" P.V.C. WEEP HOLES AT 10' (PL. 2" ABOVE SIDEWALK)

PERMISSIBLE CONSTRUCTION JOINT WITH 3" X 2" BLOCKOUT

1/4" R.

1' - 0"

7'-0"

2'

8"
1. REINFORCED CONCRETE PAVEMENT:
   A. ALL CURBS SHALL BE PLACED INTEGRAL WITH PAVEMENT UNLESS OTHERWISE APPROVED BY THE OWNER.
   B. CURBS SHALL MEET THE SAME COMpressive STRENGTH AS SPECIFIED FOR THE PAVEMENT.
   C. BAR LAPS SHALL BE 30 DIAMETERS.
   D. REINFORCING BARS SHALL BE SUPPORTED BY CHAIRS OR OTHER DEVICES APPROVED BY THE OWNER.

2. SUBGRADE: (UNLESS OTHERWISE SPECIFIED BY OWNER)
   A. SUBGRADE UNDER ALL PAVEMENTS SHALL BE STABILIZED TO A MINIMUM DEPTH OF 6" WITH MATERIAL HAVING MATERIAL P.I. GREATER THAN 8.
   B. LABORATORY TESTS MUST BE PERFORMED TO DETERMINE THE AMOUNT OF HARD-GRIND CEMENT REQUIRED TO LOWER THE P.I. TO 15 OR BELOW. SATURATION P.I. (P.I. > 12.4) WILL BE THE LIMIT WHEN A SOIL'S P.I. CANNOT BE BROUGHT TO 15 OR LOWER.
   C. WHERE THE INPLACE MATERIAL HAS A P.I. OF LESS THAN 15, THE SUBGRADE SHALL BE SCARRIFIED TO A MINIMUM DEPTH OF 6" AND RECOMPACTED.

3. IF THE ROADWAY IS A DESIGNATED BIKE ROUTE OR BIKE USAGE IS ANTICIPATED, REFER TO NATIONAL COUNCIL OF STATE PROFESSIONAL ENGINEERS DESIGN MANUAL FOR DESIGN GUIDANCE.

C. Where sulfates are present, consult a geotechnical engineer for recommended subgrade treatment.

If the PI is 15 or greater lime shall be used, if the PI is less than 15 cement shall be used or as recommended by a geotech engineer.

LIMITS OF EXCAVATION

DEPTH OF TRENCH (FT.)
- 0 TO 6
- 6 TO 10
- 10 TO 15
- OVER 15

EXIST. IN FT. OUTSIDE NEAT LINES OF PIPE SUBRAIN
- 1.00
- 1.50
- 2.00
- 2.50

SECTION
N.T.S.

FILTER MATERIAL SPECIFICATIONS

SIEVE SIZE
- 1 1/2
- 3/4
- 3/8
- NO. 4

PERCENTAGE RETAINED ON SIEVE
- TYPE A
- TYPE B
- 0 - 10
- 0 - 10
- 15 - 35
- 35 - 55
- 35 - 65
- 40 - 60

MATERIAL FINER THAN NO. 4 SIEVE
- 20
- 50
- 35 - 65
- 75 - 100

TYPES OF PIPE ACCEPTABLE FOR USE AS SUBRAIN
1. PERFORATED CORRUGATED METAL PIPE
2. PERFORATED PVC PIPE
3. PERFORATED POLYETHYLENE PIPE

SUBDRAINS
PAVEMENT SUBGRADE
TYPE "A"
\[ \Delta = 1^\circ \text{ to } 10^\circ \]
N.I.S.

TYPE "B"
\[ \Delta = 11^\circ \text{ to } 40^\circ \]
N.I.S.

NOTES:
1. DIMENSIONS W, C, A, AND B SHALL BE SPECIFIED ON THE PLANS IN ACCORDANCE WITH STD. DWG. NO. 2040.
TYPE "C"
\[\Delta = 41' \text{ to } 70'\]
N.T.S.

Type "D"
\[\Delta = 71' \text{ to } 90'\]
N.T.S.

Notes:
1. Dimensions W, C, A, and B shall be specified on the plans in accordance with Std. SWG No. 2240.
TYPE "E"
\[ \Delta = 91' \text{ to } 110' \]
N.T.S.

TYPE "F"
\[ \Delta = 111' \text{ to } 135' \]
N.T.S.

NOTES:
1. DIMENSIONS A, C, A, AND B SHALL BE SPECIFIED ON THE PLANS IN ACCORDANCE WITH STD. DWG. NO. 2040.
TYPE "G"
\[ \Delta = 76'\text{ to } 90' \]
N.T.S.

TYPE "H"
\[ \Delta = 61'\text{ to } 75' \]
N.T.S.

**NOTES:**
1. DIMENSIONS W. C. A. AND B SHALL BE SPECIFIED ON THE PLANS IN ACCORDANCE WITH STD. DWG. NO. 2045.
TYPE "J"
\[ \Delta = 45^\circ \text{ to } 60^\circ \]

NOTES
1. DIMENSIONS W, C, A, AND B SHALL BE SPECIFIED ON THE PLANS IN ACCORDANCE WITH STD. SWS NO. 2040.
INTERSECTION OF PROPOSED ALLEY WITH EXISTING ALLEY PAVEMENT

NOTE:
GEOMETRICS OF PROPOSED ALLEY SHALL BE SHOWN ON THE PLANS IN ACCORDANCE WITH TYPE "C", "W", OR "T."
This metal beam element is to be twisted through 90° in the field.

A maximum of eight posts adjacent to the structure shall be spaced at 3'-1 1/2" (see Note 2).

1. This dimension measured to center of splice when special end shoe is used.
2. Variations in post spacing and/or the use of spacer blocks or shims, may be required by the engineer, in order to accommodate the required beam element connection to structures.

Metal Beam Guard Fence

Roadside Placement & Beam Elements

METAL BEAM GUARD FENCE

ROADSIDE PLACEMENT & BEAM ELEMENTS
1. Except where used at structures that are narrower than crown width, or where otherwise indicated on plans, the face of the guard fence shall be located a minimum of one foot from the shoulder edge on existing roadways and a minimum of two feet from the shoulder edge on new construction. The exact position shall be as shown elsewhere on the plans or as directed by the engineer. Beam elements shall be transitioned to a smooth connection with other structures or beam elements as shown elsewhere on plans.

2. At the option of the contractor, the metal beam elements for the guard fence may be furnished in either 12 1/2 or 25 foot nominal lengths. Beam elements shall be furnished with post bolt slots for 5/8" diameter bolt connections to posts.

3. Bolts shall be of sufficient length to extend through the full thickness of the nut and no more than 3/4" beyond it.

4. The top of the terminal anchor post assembly and all steel fittings thereon shall be galvanized as shown.

5. Where rock is encountered, or where shown on the plans, the diameter of the holes and the material for backfilling shall be as directed by the engineer. Timber posts shall not be set in concrete.

6. The terminal anchor post shall be set in class "A" concrete. Concrete shall be subsidiary to the bid item "Metal Beam Guard Fence."

7. Timber posts may be beveled at approximately 10 degrees on the top or both ends with high side of top of post placed toward the roadway or they may be doged.

8. An anchor other than to a terminal anchor post shall consist of a connection similar to the beam element splice or similar to the special end shoe.

9. Special fabrication will be required in installations having a curvature of less than 100' radius.

10. Wood posts must be treated in manner approved by the engineer.

11. The special end shoe anchor may be used with the 18" x 5' - 0" concrete footing or the angle anchor may be used with the 12' - 0" square or equivalent concrete footing.

12. All metal elements will be 12 gauge steel unless stated otherwise on plans.
**TYPICAL CROSS SECTION**

- **NOTES:**
  - The T.A.S. and typically adjacent 25’ M.B.G.F. should be flared from the shoulder edge at 22:1 to provide a 3’ USA offset to buried anchors.
  - Where length (L) of M.B.G.F. is 50 feet, post spacing shall be as detailed herein (see plan layout for S.P.L. M.B.G.F. over 50 feet).
  - Where length (L) of M.B.G.F. is 25 feet or more, post spacing shall be 3’-1”/2” for the 25’ section adjacent to the bridge, 5’-6” for the 50’ section adjacent to the bridge, and 6’-3” for the remaining intervening length.
  - The slope between the crown line and outside edge of shoulder should be 0:1 or flatter. The crown should be widened to accommodate M.B.G.F. typically. The crown line should be 2 feet from the outside shoulder edge (see typical cross section).
  - For restrictive width bridges, a 25 foot tangent section of M.B.G.F. should connect to the windwall. The remaining M.B.G.F. should be flared within the highway (lane and shoulder area) should be flared at the rate of 0:1 or flatter (lateral). Length should be governed by tabulated values or the length necessary to locate the buried anchor at a 2-foot offset from shoulder edge, whichever is greater.
  - Average daily traffic (ADT) for the current year, where significant traffic volume growth is anticipated on low volume (0-750 ADT), high volume, use lengths shown for higher volume category.
  - Provide minimum 50’ M.B.G.F. plus T.A.S. for four-lane undivided highways. For four-lane divided highways with a flush median or for highways with six or more lanes, M.B.G.F. is not a required bridge end treatment. However, other nearby hazards may warrant shielding with M.B.G.F.

**POST TREATMENT AT STRUCTURES**

- **NOTED:**
  - Typical connection–see bridge rail or other plan sheets for details of M.B.G.F. to bridge rail connection.

**DESIGN NOTES:**

1. For metal beam guard fence details and method of termination, see Std. Dirs. No. 2270A — 2270E.
2. Variations in post spacing and/or the use of spacer blocks or shims may be required by the engineer in order to accommodate the required beam element connection to structures.
3. Quantities of metal beam guard fence (M.B.G.F.) at individual bridge ends are shown elsewhere in the plans.

**METAL BEAM GUARD FENCE**

**TWO-WAY TRAFFIC BRIDGE END**

**STANDARD INSTRUCTION REFERENCE**

801.2

**DATE:**

OCT. ’04

**REFERENCING:**

2280B
Next Steps

- Determine action items for Subcommittee Members and NCTCOG staff
Next Standard Drawings Meetings

June 15, 2020
June 8\textsuperscript{th}?
10am-11:30am
UberConference